

SEQUENCE LISTING

(1) GENERAL INFORMATION:

- (i) APPLICANT: Fischer, Gerald W.
Schuman, Richard F.
Wong, Hing
Stinson, Jeffrey L.
- (ii) TITLE OF INVENTION: OPSONIC AND PROTECTIVE MONOCLONAL AND
CHIMERIC ANTIBODIES SPECIFIC FOR LIPOTEICHOIC ACID OF GRAM
POSITIVE BACTERIA
- (iii) NUMBER OF SEQUENCES: 89
- (iv) CORRESPONDENCE ADDRESS:
 - (A) ADDRESSEE: FINNEGAN, HENDERSON, FARABOW, GARRETT &
DUNNER, LLP
 - (B) STREET: 1300 I Street, NW
 - (C) CITY: Washington
 - (D) STATE: DC
 - (E) COUNTRY: USA
 - (F) ZIP: 20005-3315
- (v) COMPUTER READABLE FORM:
 - (A) MEDIUM TYPE: Floppy disk
 - (B) COMPUTER: IBM PC compatible
 - (C) OPERATING SYSTEM: PC-DOS/MS-DOS
 - (D) SOFTWARE: PatentIn Release #1.0, Version #1.30
- (vi) CURRENT APPLICATION DATA:
 - (A) APPLICATION NUMBER: US 09/097,055
 - (B) FILING DATE: 15-JUN-1998
- (viii) ATTORNEY/AGENT INFORMATION:
 - (A) NAME: Einaudi, Carol P.
 - (B) REGISTRATION NUMBER: 32,220
 - (C) REFERENCE/DOCKET NUMBER: 04995.0041-00000
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(2) INFORMATION FOR SEQ ID NO:1:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 15 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS:
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

Trp Arg Met Tyr Phe Ser His Arg His Ala His Leu Arg Ser Pro
1 5 10 15

(2) INFORMATION FOR SEQ ID NO:2:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 15 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

Trp His Trp Arg His Arg Ile Pro Leu Gln Leu Ala Ala Gly Arg
1 5 10 15

(2) INFORMATION FOR SEQ ID NO:3:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 21 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid

- (A) DESCRIPTION: /desc = "primer"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

TGAATTTTCT GTATGAGGTT T

21

(2) INFORMATION FOR SEQ ID NO:4:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 30 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 1..30

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

GGG GCT CAT GCG GAT AGG GTT TAT GGG GCC
 Gly Ala His Ala Asp Arg Val Tyr Gly Ala
 1 5 10

30

(2) INFORMATION FOR SEQ ID NO:5:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 10 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

Gly Ala His Ala Asp Arg Val Tyr Gly Ala
 1 5 10

(2) INFORMATION FOR SEQ ID NO:6:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 30 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 1..30

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

GGG ANT CAT GCG GAT AGG GTT TAT GGG GCC
 Gly Xaa His Ala Asp Arg Val Tyr Gly Ala
 1 5 10

30

(2) INFORMATION FOR SEQ ID NO:7:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 10 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

Gly Xaa His Ala Asp Arg Val Tyr Gly Ala
 1 5 10

(2) INFORMATION FOR SEQ ID NO:8:

(A) LENGTH: 57 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ix) FEATURE:

(A) NAME/KEY: CDS
(B) LOCATION: 1..57

GGG GCT TGG CAT TGG CGT CAT CGT ATT CCT CTT CAG CTT GCT GCT GGT	48
Gly Ala Trp His Trp Arg His Arg Ile Pro Leu Gln Leu Ala Ala Gly	
1 5 10 15	
CGT GGG GCC	57
Arg Gly Ala	

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 19 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

Gly Ala Trp His Trp Arg His Arg Ile Pro Leu Gln Leu Ala Ala Gly
1 5 10 15
Arg Gly Ala

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 57 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

(A) NAME/KEY: CDS
(B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

GGG GCT CGT CGG CAT GGT AAT TTT TCT CAT TTT TTT CAT CGG TCG TTG 48
Gly Ala Arg Arg His Gly Asn Phe Ser His Phe Phe His Arg Ser Leu
1 5 10 15

ATT GGG GCC 57
Ile Gly Ala

(2) INFORMATION FOR SEQ ID NO:11:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

Gly Ala Arg Arg His Gly Asn Phe Ser His Phe Phe His Arg Ser Leu
1 5 10 15

Ile Gly Ala

(2) INFORMATION FOR SEQ ID NO:12:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 57 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

GGG GCT TGG AAG GCT TTG TTT AGT CAT TCT TAT CGT CCT CGG GGT TCG 48
Gly Ala Trp Lys Ala Leu Phe Ser His Ser Tyr Arg Pro Arg Gly Ser
1 5 10 15

GCT GGG GCC 57
Ala Gly Ala

(2) INFORMATION FOR SEQ ID NO:13:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

Gly Ala Trp Lys Ala Leu Phe Ser His Ser Tyr Arg Pro Arg Gly Ser
1 5 10 15

Ala Gly Ala

(2) INFORMATION FOR SEQ ID NO:14:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 57 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

GGG GCT AGG CAT TGG CGT CAT CGT ATT CCT CTT CAG CTT GCT GCT GGT 48
Gly Ala Arg His Trp Arg His Arg Ile Pro Leu Gln Leu Ala Ala Gly
1 5 10 15

CGT GGG GCC 57
Arg Gly Ala

(2) INFORMATION FOR SEQ ID NO:15:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

Gly Ala Arg His Trp Arg His Arg Ile Pro Leu Gln Leu Ala Ala Gly
1 5 10 15

Arg Gly Ala

(2) INFORMATION FOR SEQ ID NO:16:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 57 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

- (ix) FEATURE:
(A) NAME/KEY: CDS
(B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

GGG GCT TGG CAT TGG CGT CAT CGT ATT CCT CTT CAG CTT GCT GCT GGT 48
Gly Ala Trp His Trp Arg His Arg Ile Pro Leu Gln Leu Ala Ala Gly
1 5 10 15

CGT GGG GCC 57
Arg Gly Ala

(2) INFORMATION FOR SEQ ID NO:17:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 19 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

Gly Ala Trp His Trp Arg His Arg Ile Pro Leu Gln Leu Ala Ala Gly
1 5 10 15

Arg Gly Ala

(2) INFORMATION FOR SEQ ID NO:18:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 57 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

- (ix) FEATURE:
(A) NAME/KEY: CDS

(B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:18:

GGG GCT TGG CAT TGG CGT CAT CGT ATT CCT CTT CAG CTT GCT GCT GGT	48
Gly Ala Trp His Trp Arg His Arg Ile Pro Leu Gln Leu Ala Ala Gly	
1 5 10 15	
CGT GGG GCC	57
Arg Gly Ala	

(2) INFORMATION FOR SEQ ID NO:19:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

Gly Ala Trp His Trp Arg His Arg Ile Pro Leu Gln Leu Ala Ala Gly
1 5 10 15
Arg Gly Ala

(2) INFORMATION FOR SEQ ID NO:20:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 57 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

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(ix) FEATURE:
      (A) NAME/KEY: CDS
      (B) LOCATION: 1..57
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(xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

GGG GCT CAG GTG GCT GTT TTG TAT CCT CCT TTG GCT GAT GCT ACT GAG	48
Gly Ala Gln Val Ala Val Leu Tyr Pro Pro Leu Ala Asp Ala Thr Glu	
1 5 10 15	
CTT GGG GCC	57
Leu Gly Ala	

(2) INFORMATION FOR SEQ ID NO:21:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

Gly Ala Gln Val Ala Val Leu Tyr Pro Pro Leu Ala Asp Ala Thr Glu
1 5 10 15

Leu Gly Ala

(2) INFORMATION FOR SEQ ID NO:22:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 57 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:22:

GGG GCT CGT CGG CAT GGT AAT TTT TCT CAT TTT TTT CAT CGG TCG TTG 48
Gly Ala Arg Arg His Gly Asn Phe Ser His Phe Phe His Arg Ser Leu
1 5 10 15

ATT GGG GCC 57
Ile Gly Ala

(2) INFORMATION FOR SEQ ID NO:23:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:23:

Gly Ala Arg Arg His Gly Asn Phe Ser His Phe Phe His Arg Ser Leu
1 5 10 15

Ile Gly Ala

(2) INFORMATION FOR SEQ ID NO:24:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 57 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
 (B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:24:

GGG	GCT	CGT	CGG	CAT	GGT	AAT	TTT	TCT	CAT	TTT	TTT	CAT	CGG	TCG	TTG	48
Gly	Ala	Arg	Arg	His	Gly	Asn	Phe	Ser	His	Phe	Phe	His	Arg	Ser	Leu	
1				5				10						15		
ATT GGG GCC																57
Ile Gly Ala																

(2) INFORMATION FOR SEQ ID NO:25:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 19 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:25:

Gly	Ala	Arg	Arg	His	Gly	Asn	Phe	Ser	His	Phe	Phe	His	Arg	Ser	Leu
1				5				10						15	
Ile Gly Ala															

(2) INFORMATION FOR SEQ ID NO:26:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 57 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:
(A) NAME/KEY: CDS
(B) LOCATION: 1..57

GGG GCT TGG CGT ATG TAT TTT TCT CAT CGT CAT GCG CAT CTT CGT AGT	48
Gly Ala Trp Arg Met Tyr Phe Ser His Arg His Ala His Leu Arg Ser	
1 5 10 15	
 CCT GGG GCC	 57
Pro Gly Ala	

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:27:

(2) INFORMATION FOR SEQ ID NO:28:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 57 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ix) FEATURE:

(A) NAME/KEY: CDS
(B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:28:

GGG GCT TGG CGT ATG TAT TTT TCT CAT CGT CAT GCG CAT CTT CGT AGT	48
Gly Ala Trp Arg Met Tyr Phe Ser His Arg His Ala His Leu Arg Ser	
1 5 10 15	
CCT GGG GCC	57
Pro Gly Ala	

(2) INFORMATION FOR SEQ ID NO:29:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:29:

Gly Ala Trp Arg Met Tyr Phe Ser His Arg His Ala His Leu Arg Ser
1 5 10 15

Pro Gly Ala

(2) INFORMATION FOR SEQ ID NO:30:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 57 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:30:

GGG GCT TGG CGG AAG TAT TTT TCT TAT CAT CAT GCG CAT CTT TGT AGT 48
Gly Ala Trp Arg Lys Tyr Phe Ser Tyr His His Ala His Leu Cys Ser
1 5 10 15

CCT GGG GCC 57
Pro Gly Ala

(2) INFORMATION FOR SEQ ID NO:31:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:31:

Gly	Ala	Trp	Arg	Lys	Tyr	Phe	Ser	Tyr	His	His	Ala	His	Leu	Cys	Ser
1				5					10					15	

Pro Gly Ala

(2) INFORMATION FOR SEQ ID NO:32:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 57 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:32:

GGG	GCT	TGG	CGT	ATG	TAT	TTT	TCT	CAT	CGT	CAT	GCG	CAT	CTT	CGT	AGT	48
Gly	Ala	Trp	Arg	Met	Tyr	Phe	Ser	His	Arg	His	Ala	His	Leu	Arg	Ser	
1				5					10					15		

CCT	GGG	GCC	57
Pro	Gly	Ala	

(2) INFORMATION FOR SEQ ID NO:33:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 19 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:33:

Gly	Ala	Trp	Arg	Met	Tyr	Phe	Ser	His	Arg	His	Ala	His	Leu	Arg	Ser
1				5					10					15	

Pro Gly Ala

(2) INFORMATION FOR SEQ ID NO:34:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 57 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

(A) NAME/KEY: CDS

(B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:34:

GGG GCT TGG CGT ATG TAT TTT TCT CAT CGT CAT GCG CAT CTT CGT AGT	48
Gly Ala Trp Arg Met Tyr Phe Ser His Arg His Ala His Leu Arg Ser	
1 5 10 15	
CCT GGG GCC	57
Pro Gly Ala	

(2) INFORMATION FOR SEQ ID NO:35:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 19 amino acids

(B) TYPE: amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:35:

Gly Ala Trp Arg Met Tyr Phe Ser His Arg His Ala His Leu Arg Ser	
1 5 10 15	
Pro Gly Ala	

(2) INFORMATION FOR SEQ ID NO:36:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 57 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

(A) NAME/KEY: CDS

(B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:36:

GGG GCT TGG CGT ATG TAT TTT TCT CAT CGT CAT GCG CAT CTT CGT AGT	48
Gly Ala Trp Arg Met Tyr Phe Ser His Arg His Ala His Leu Arg Ser	
1 5 10 15	

(2) INFORMATION FOR SEQ ID NO:37:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 19 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:37:

Gly Ala Trp Arg Met Tyr Phe Ser His Arg His Ala His Leu Arg Ser
1 5 10 15

Pro Gly Ala

(2) INFORMATION FOR SEQ ID NO:38:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 57 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
 (B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:38:

GGG GCT CGT CGG CAT GGT AAT TTT TCT CAT TTT TTT CAT CGG TCG TTG 48
Gly Ala Arg Arg His Gly Asn Phe Ser His Phe Phe His Arg Ser Leu
1 5 10 15

ATT GGG GCC 57
Ile Gly Ala

(2) INFORMATION FOR SEQ ID NO:39:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 19 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:39:

Gly Ala Arg Arg His Gly Asn Phe Ser His Phe Phe His Arg Ser Leu
1 5 10 15

Ile Gly Ala

(2) INFORMATION FOR SEQ ID NO:40:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 57 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
(B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:40:

GGG GCT TGG CAT TGG CGT CAT CGT ATT CCT CTT CAG CTT GCT GCT GGT 48
Gly Ala Trp His Trp Arg His Arg Ile Pro Leu Gln Leu Ala Ala Gly
1 5 10 15

CGT GGG GCC 57
Arg Gly Ala

(2) INFORMATION FOR SEQ ID NO:41:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 19 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:41:

Gly Ala Trp His Trp Arg His Arg Ile Pro Leu Gln Leu Ala Ala Gly
1 5 10 15

Arg Gly Ala

(2) INFORMATION FOR SEQ ID NO:42:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 57 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single

(ii) MOLECULE TYPE: cDNA

(A) NAME/KEY: CDS
(B) LOCATION: 1..57

GGG GCT CGT CGG CAT GGT AAT TTT TCT CAT TTT TTT CAT CGG TCG TTG 48
Gly Ala Arg Arg His Gly Asn Phe Ser His Phe Phe His Arg Ser Leu
1 5 10 15

ATT GGG GCC
Ile Gly Ala 57

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:43:

Gly Ala Arg Arg His Gly Asn Phe Ser His Phe Phe His Arg Ser Leu
1 5 10 15

Ile Gly Ala

(2) INFORMATION FOR SEQ ID NO:44:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 57 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(A) NAME/KEY: CDS
(B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:44:

GGG GCT GAT TGG ATT ACT TTT CAT CGT CGT CAT CAT GAT CGT GTT CTT 48
 Gly Ala Asp Trp Ile Thr Phe His Arg Arg His His Asp Arg Val Leu
 1 5 10 15

TCT GGG GCC 57
 Ser Gly Ala

(2) INFORMATION FOR SEQ ID NO:45:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 19 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:45:

Gly Ala Asp Trp Ile Thr Phe His Arg Arg His His Asp Arg Val Leu
 1 5 10 15

Ser Gly Ala

(2) INFORMATION FOR SEQ ID NO:46:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 57 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

- (ix) FEATURE:
 (A) NAME/KEY: CDS
 (B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:46:

GGG GCT GGT TGG ATT ACT TTT CAT CGT CGT CAT CAT GAT CGT GTT CTT 48
 Gly Ala Gly Trp Ile Thr Phe His Arg Arg His His Asp Arg Val Leu
 1 5 10 15

TCT GGG GCC 57
 Ser Gly Ala

(2) INFORMATION FOR SEQ ID NO:47:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 19 amino acids
 (B) TYPE: amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:47:

Gly Ala Gly Trp Ile Thr Phe His Arg Arg His His Asp Arg Val Leu
1 5 10 15

Ser Gly Ala

(2) INFORMATION FOR SEQ ID NO:48:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 57 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

(A) NAME/KEY: CDS
(B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:48:

GGG GCT GGG AAG GCT ATG TTT AGT CAT TCT TAT CGT CAT CGG GGT TCG 48
Gly Ala Gly Lys Ala Met Phe Ser His Ser Tyr Arg His Arg Gly Ser
1 5 10 15
GCT GGG GCC 57
Ala Gly Ala

(2) INFORMATION FOR SEQ ID NO:49:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 19 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:49:

Gly Ala Gly Lys Ala Met Phe Ser His Ser Tyr Arg His Arg Gly Ser
1 5 10 15

Ala Gly Ala

(2) INFORMATION FOR SEQ ID NO:50:

- 91

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:52:

GGG GCT AGT CGT CAT ATG CTT GCT CGG TGG TCG CGT TTG CTT GCT GTT 48
Gly Ala Ser Arg His Met Leu Ala Arg Trp Ser Arg Leu Leu Ala Val
1 5 10 15

CCT GGG GCC
Pro Gly Ala

(2) INFORMATION FOR SEQ ID NO:53:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:53:

Gly Ala Ser Arg His Met Leu Ala Arg Trp Ser Arg Leu Leu Ala Val
1 5 10 15

Pro Gly Ala

(2) INFORMATION FOR SEQ ID NO:54:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 57 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
(B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:54:

GGG GCT GGG AAG GCT ATG TTT AGT CAT TCT TAT CGT CAT CGG GGT TCG 48
Gly Ala Gly Lys Ala Met Phe Ser His Ser Tyr Arg His Arg Gly Ser
1 5 10 15

GCT GGG GCC 57
Ala Gly Ala

(2) INFORMATION FOR SEQ ID NO:55:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 19 amino acids

(B) TYPE: amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:55:

Gly Ala Gly Lys Ala Met Phe Ser His Ser Tyr Arg His Arg Gly Ser
1 5 10 15

Ala Gly Ala

(2) INFORMATION FOR SEQ ID NO:56:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 57 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

(A) NAME/KEY: CDS

(B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:56:

GGG GCT TGG CAT TGG CGT CAT CGT ATT CCT CTT CAG CTT GCT GCT GGT 48
Gly Ala Trp His Trp Arg His Arg Ile Pro Leu Gln Leu Ala Ala Gly
1 5 10 15

CGT GGG GCC 57
Arg Gly Ala

(2) INFORMATION FOR SEQ ID NO:57:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 19 amino acids

(B) TYPE: amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:57:

Gly Ala Trp His Trp Arg His Arg Ile Pro Leu Gln Leu Ala Ala Gly
1 5 10 15

Arg Gly Ala

```

(i) SEQUENCE CHARACTERISTICS:
    (A) LENGTH: 57 base pairs
    (B) TYPE: nucleic acid
    (C) STRANDEDNESS: single
    (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:
    (A) NAME/KEY: CDS
    (B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:58:

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(2) INFORMATION FOR SEQ ID NO:59:

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:59:

(2) INFORMATION FOR SEQ ID NO:60:

(ii) MOLECULE TYPE: cDNA

94

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:60:

GGG GCT TGG AAG GCT TTG TTT AGT CAT TCT TAT CGT CCT CGG GGT TCG	48
Gly Ala Trp Lys Ala Leu Phe Ser His Ser Tyr Arg Pro Arg Gly Ser	
1 5 10 15	
GCT GGG GCC	57
Ala Gly Ala	

(2) INFORMATION FOR SEQ ID NO:61:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 19 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:61:

Gly Ala Trp Lys Ala Leu Phe Ser His Ser Tyr Arg Pro Arg Gly Ser	
1 5 10 15	
Ala Gly Ala	

(2) INFORMATION FOR SEQ ID NO:62:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 57 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:62:

GGG GCT CAG GTG GCT GTT TTG TAT CCT CCT TTG GCT GAT GCT ACT GAG	48
Gly Ala Gln Val Ala Val Leu Tyr Pro Pro Leu Ala Asp Ala Thr Glu	
1 5 10 15	
CTT GGG GCC	57
Leu Gly Ala	

(2) INFORMATION FOR SEQ ID NO:63:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 19 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:63:

Gly	Ala	Gln	Val	Ala	Val	Leu	Tyr	Pro	Pro	Leu	Ala	Asp	Ala	Thr	Glu
1				5					10					15	

Leu Gly Ala

(2) INFORMATION FOR SEQ ID NO:64:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 57 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 1..57

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:64:

GGG	GCT	TGG	CGT	ATG	TAT	TTT	TCT	CAT	CGT	CAT	GCG	CAT	CTT	CGT	AGT	48
Gly	Ala	Trp	Arg	Met	Tyr	Phe	Ser	His	Arg	His	Ala	His	Leu	Arg	Ser	
1				5					10					15		

CCT	GGG	GCC	57
Pro	Gly	Ala	

(2) INFORMATION FOR SEQ ID NO:65:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 19 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:65:

Gly	Ala	Trp	Arg	Met	Tyr	Phe	Ser	His	Arg	His	Ala	His	Leu	Arg	Ser
1				5					10					15	

Pro Gly Ala

(2) INFORMATION FOR SEQ ID NO:66:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 30 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

- (ix) FEATURE:
 - (A) NAME/KEY: CDS
 - (B) LOCATION: 1..30

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:66:

GGG GCT CAT GCG GAT AGG GTT TAT GGG GCC
Gly Ala His Ala Asp Arg Val Tyr Gly Ala
1 5 10

30

(2) INFORMATION FOR SEQ ID NO:67:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 10 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:67:

Gly Ala His Ala Asp Arg Val Tyr Gly Ala
1 5 10

(2) INFORMATION FOR SEQ ID NO:68:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 45 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

- (ii) MOLECULE TYPE: other nucleic acid
 - (A) DESCRIPTION: /desc = "primer"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:68:

ATTTCAGGCC CAGCCGGCCA TGGCCGARGT RMAGCTKSAK GAGWC

45

(2) INFORMATION FOR SEQ ID NO:69:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 45 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

- (ii) MOLECULE TYPE: other nucleic acid
 - (A) DESCRIPTION: /desc = "primer"

- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:69:

ATTTCAGGCC CAGCCGGCCA TGGCCGARGT YCARCTKCAR CARYC

45

- (2) INFORMATION FOR SEQ ID NO:70:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 45 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

- (ii) MOLECULE TYPE: other nucleic acid
 - (A) DESCRIPTION: /desc = "primer"

- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:70:

ATTTCAGGCC CAGCCGGCCA TGGCCCAGGT GAAGCTKSTS GARTC

45

- (2) INFORMATION FOR SEQ ID NO:71:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 45 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

- (ii) MOLECULE TYPE: other nucleic acid
 - (A) DESCRIPTION: /desc = "primer"

- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:71:

ATTTCAGGCC CAGCCGGCCA TGGCCGAVGT GMWGCTKGTG GAGWC

45

- (2) INFORMATION FOR SEQ ID NO:72:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 45 base pairs
 - (B) TYPE: nucleic acid

(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid
(A) DESCRIPTION: /desc = "primer"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:72:

ATTTCAGGCC CAGCCGGCCA TGGCCCAGGT BCARCTKMAR SARTC

45

(2) INFORMATION FOR SEQ ID NO:73:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 35 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid
(A) DESCRIPTION: /desc = "primer"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:73:

GCTGCCACCG CCACCTGMRG AGACDGTGAS TGARG

35

(2) INFORMATION FOR SEQ ID NO:74:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 35 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid
(A) DESCRIPTION: /desc = "primer"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:74:

GCTGCCACCG CCACCTGMRG AGACDGTGAS MGTRG

35

(2) INFORMATION FOR SEQ ID NO:75:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 35 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid

(A) DESCRIPTION: /desc = "primer"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:75:

GCTGCCACCG CCACCTGMRG AGACDGTGAS CAGRG

35

(2) INFORMATION FOR SEQ ID NO:76:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 32 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid

(A) DESCRIPTION: /desc = "primer"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:76:

CCCGGGCCAC CATGGAGACA GACACACTCC TG

32

(2) INFORMATION FOR SEQ ID NO:77:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 35 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid

(A) DESCRIPTION: /desc = "primer"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:77:

CCCGGGCCAC CATGGATTTT CAAGTGCAGA TTTTC

35

(2) INFORMATION FOR SEQ ID NO:78:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 32 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid

(A) DESCRIPTION: /desc = "primer"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:78:

CCCGGGCCAC-CATGGAGWCA CAKWCTCAGG TC

32

(2) INFORMATION FOR SEQ ID NO:79:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 33 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid

(A) DESCRIPTION: /desc = "primer"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:79:

CCCGGGCCAC CATGKCCCCW RCTCAGYTTT TKG

33

(2) INFORMATION FOR SEQ ID NO:80:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 31 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid

(A) DESCRIPTION: /desc = "primer"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:80:

CCCGGGCACC ATGAAGTTGC CTGTTAGGCT G

31

(2) INFORMATION FOR SEQ ID NO:81:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 23 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid

(A) DESCRIPTION: /desc = "primer"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:81:

GCACCTCCAG ATGTAACTG CTC

23

(2) INFORMATION FOR SEQ ID NO:82:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 54 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid

- (A) DESCRIPTION: /desc = "primer"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:82:

TAATATCGCG ACAGCTACAG GTGTCCACTC CCGAAGTGAT GCTGGTGGAG WCTG

54

(2) INFORMATION FOR SEQ ID NO:83:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 30 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid

- (A) DESCRIPTION: /desc = "primer"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:83:

TTATAGAATT CTGAGGAGAC GGTGAGTGAG

30

(2) INFORMATION FOR SEQ ID NO:84:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 29 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid

- (A) DESCRIPTION: /desc = "primer"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:84:

TTAGGCGATA TCGTTCTCTC CCAGTCTCC

29

(2) INFORMATION FOR SEQ ID NO:85:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 46 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid
 (A) DESCRIPTION: /desc = "primer"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:85:

GTAACCGTTC GAAAAGTGTA CTTACGTTTT ATTTCCAGCA TGGTCC

,46

(2) INFORMATION FOR SEQ ID NO:86:

(i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 369 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

(A) NAME/KEY: CDS
 (B) LOCATION: 1..369

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:86:

GAA GTG ATG CTG GTG GAG TCT GGT GGA GGA TTG GTG CAG CCT AAA GGG	48
Glu Val Met Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Lys Gly	
1 5 10 15	
TCA TTG AAA CTC TCA TGT GCA GCC TCT GGA TTC ACC TTC AAT AAC TAC	96
Ser Leu Lys Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asn Asn Tyr	
20 25 30	
GCC ATG AAT TGG GTC CGC CAG GCT CCA GGA AAG GGT TTG GAA TGG GTT	144
Ala Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val	
35 40 45	
GCT CGC ATA AGA AGT AAA AGT AAT AAT TAT GCA ACA TTT TAT GCC GAT	192
Ala Arg Ile Arg Ser Lys Ser Asn Asn Tyr Ala Thr Phe Tyr Ala Asp	
50 55 60	
TCA GTG AAA GAC AGG TTC ACC ATC TCC AGA GAT GAT TCA CAA AGC ATG	240
Ser Val Lys Asp Arg Phe Thr Ile Ser Arg Asp Asp Ser Gln Ser Met	
65 70 75 80	
CTC TAT CTG CAA ATG AAC AAC TTG AAA ACT GAG GAC ACA GCC ATG TAT	288
Leu Tyr Leu Gln Met Asn Asn Leu Lys Thr Glu Asp Thr Ala Met Tyr	
85 90 95	

TAC TGT GTG AGA CGG GGG GCT TCA GGG ATT GAC TAT GCT ATG GAC TAC	336
Tyr Cys Val Arg Arg Gly Ala Ser Gly Ile Asp Tyr Ala Met Asp Tyr	
100 105 110	
TGG GGT CAA GGA ACC TCA CTC ACC GTC TCC TCA	369
Trp Gly Gln Gly Thr Ser Leu Thr Val Ser Ser	
115 120	

(2) INFORMATION FOR SEQ ID NO:87:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 123 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:87:

Glu Val Met Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Lys Gly	
1 5 10 15	
Ser Leu Lys Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asn Asn Tyr	
20 25 30	
Ala Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val	
35 40 45	
Ala Arg Ile Arg Ser Lys Ser Asn Asn Tyr Ala Thr Phe Tyr Ala Asp	
50 55 60	
Ser Val Lys Asp Arg Phe Thr Ile Ser Arg Asp Asp Ser Gln Ser Met	
65 70 75 80	
Leu Tyr Leu Gln Met Asn Asn Leu Lys Thr Glu Asp Thr Ala Met Tyr	
85 90 95	
Tyr Cys Val Arg Arg Gly Ala Ser Gly Ile Asp Tyr Ala Met Asp Tyr	
100 105 110	
Trp Gly Gln Gly Thr Ser Leu Thr Val Ser Ser	
115 120	

(2) INFORMATION FOR SEQ ID NO:88:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 318 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 1..318

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:88:

CAA ATT GTT CTC TCC CAG TCT CCA GCA ATC CTG TCT GCA TCT CCA GGG	48
Gln Ile Val Leu Ser Gln Ser Pro Ala Ile Leu Ser Ala Ser Pro Gly	
1 5 10 15	
GAA AAG GTC ACA ATG ACT TGC AGG GCC AGC TCA AGT GTA AAT TAC ATG	96
Glu Lys Val Thr Met Thr Cys Arg Ala Ser Ser Ser Val Asn Tyr Met	
20 25 30	
CAC TGG TAC CAG CAG AAG CCA GGA TCC TCC CCC AAA CCC TGG ATT TCT	144
His Trp Tyr Gln Gln Lys Pro Gly Ser Ser Pro Lys Pro Trp Ile Ser	
35 40 45	
GCC ACA TCC AAC CTG GCT TCT GGA GTC CCT GCT CGC TTC AGT GGC AGT	192
Ala Thr Ser Asn Leu Ala Ser Gly Val Pro Ala Arg Phe Ser Gly Ser	
50 55 60	
GGG TCT GGG ACC TCT TAC TCT CTC ACA ATC AGC AGA GTG GAG GCT GAA	240
Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Arg Val Glu Ala Glu	
65 70 75 80	
GAT GCT GCC ACT TAT TAC TGC CAG CAG TGG AGT AGT AAC CCA CCC ACG	288
Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asn Pro Pro Thr	
85 90 95	
TTC GGA GGG GGG ACC ATG CTG GAA ATA AGA	318
Phe Gly Gly Gly Thr Met Leu Glu Ile Arg	
100 105	

(2) INFORMATION FOR SEQ ID NO:89:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 106 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:89:

Gln Ile Val Leu Ser Gln Ser Pro Ala Ile Leu Ser Ala Ser Pro Gly	
1 5 10 15	
Glu Lys Val Thr Met Thr Cys Arg Ala Ser Ser Ser Val Asn Tyr Met	
20 25 30	
His Trp Tyr Gln Gln Lys Pro Gly Ser Ser Pro Lys Pro Trp Ile Ser	
35 40 45	
Ala Thr Ser Asn Leu Ala Ser Gly Val Pro Ala Arg Phe Ser Gly Ser	
50 55 60	
Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Arg Val Glu Ala Glu	
65 70 75 80	

Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Ser Asn Pro Pro Thr
85 90 95

Phe Gly Gly Gly Thr Met Leu Glu Ile Arg
100 105